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TUF GAMING

TUF GAMING | LAPTOP

More info:

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Visit our multi-language website at https://www.asus.com/support/.

MyASUS offers a variety of support features including troubleshooting, products performance optimization, ASUS software integration, and helps you to organize personal desktop and increase storage space. For more details, please visit https://www.asus.com/support/FAQ/1038301/.

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About this manual

This manual provides information about the hardware and software features of your Notebook PC, organized through the following chapters:

Chapter 1: Hardware Setup

This chapter details the hardware components of your Notebook PC.

Chapter 2: Using your Notebook PC

This chapter shows you how to use the different parts of your Notebook PC.

Chapter 3: Working with Windows

This chapter provides an overview of using Windows in your Notebook PC.

Chapter 4: Power-On Self-Test (POST)

This chapter shows you how to use POST to change the settings of your Notebook PC.

Tips and FAQs

This section presents some recommended tips, hardware FAQs, and software FAQs you can refer to for maintaining and fixing common issues with your Notebook PC.

Appendices

This section includes notices and safety statements for your Notebook PC.

Conventions used in this manual

To highlight key information in this manual, some text are presented as follows:

IMPORTANT! This message contains vital information that must be followed to complete a task.

NOTE: This message contains additional information and tips that can help complete tasks.

WARNING! This message contains important information that must be followed to keep you safe while performing tasks and prevent damage to your Notebook PC's data and components.

Icons

The icons below indicate the devices you can use for completing a series of tasks or procedures on your Notebook PC.

 = Use the touchpad.

 = Use the keyboard.

Typography

Bold = This indicates a menu or an item that must be selected.

Italic = This indicates sections that you can refer to in this manual.

Safety precautions

Using your Notebook PC



This Notebook PC should only be used in environments with ambient temperatures between 5°C (41°F) and 35°C (95°F).



Refer to the rating label on the bottom of your Notebook PC and ensure that your power adapter complies with this rating.



Your Notebook PC can get warm to hot while in use or while charging the battery pack. Do not leave your Notebook PC on your lap or near any part of your body to prevent injury from heat. When working on your Notebook PC, do not place it on surfaces that can block the vents.



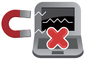
Do not use damaged power cords, accessories, and other peripherals with your Notebook PC.



While powered on, ensure that you do not carry or cover your Notebook PC with any materials that can reduce air circulation.



Do not place your Notebook PC on uneven or unstable work surfaces.



You can send your Notebook PC through x-ray machines (used on items placed on conveyor belts), but do not expose them to magnetic detectors and wands.



Contact your airline provider to learn about related in-flight services that can be used and restrictions that must be followed when using your Notebook PC in-flight.

Caring for your Notebook PC



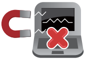
Disconnect the AC power and remove the battery pack (if applicable) before cleaning your Notebook PC. Use a clean cellulose sponge or chamois cloth dampened with warm water. Remove any extra moisture from your Notebook PC using a dry cloth. Keep any liquids from entering the chassis or keyboard gap to prevent short circuit or corrosion.



Do not use strong solvents such as alcohol, thinners, benzene, or other chemicals on or near your Notebook PC.



Do not place objects on top of your Notebook PC.



Do not expose your Notebook PC to strong magnetic or electrical fields.



Do not use or expose your Notebook PC near liquids, rain, or moisture.



Do not expose your Notebook PC to dusty environments.



Do not use your Notebook PC near gas leaks.



Do not place active electronic devices close to your Notebook PC to avoid electromagnetic wave interference to the display panel.



Do not use this Notebook PC for cryptocurrency mining (consuming a vast amount of electricity and time to gain convertible virtual currency) and/or related activities.

Proper disposal



Do not throw your Notebook PC in municipal waste. This product has been designed to enable proper reuse of parts and recycling. The symbol of the crossed out wheeled bin indicates that the product (electrical, electronic equipment and mercury-containing button cell battery) should not be placed in municipal waste. Check local regulations for disposal of electronic products.



Do not throw the battery in municipal waste. The symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

Battery safety information

Battery protection

- Frequently charging a battery under high voltage may shorten the battery life. To protect the battery, once the battery is fully charged, the system may stop charging when the battery power is between 90% and 100%.

> **NOTE:** The level at which the battery resumes charging is usually set between 90% and 99%. The actual value may vary by model.

- Charging or storing a battery in high ambient temperatures may result in permanent damage to the battery power capacity and rapidly shorten battery life. If the battery temperature is too high, the system may reduce the battery power charging capacity or even stop charging to protect the battery.
- Battery power capacity may drop even when your device is powered off and disconnected from the AC power. This is normal as the system still draws a small amount of power from the battery.

Standard battery care

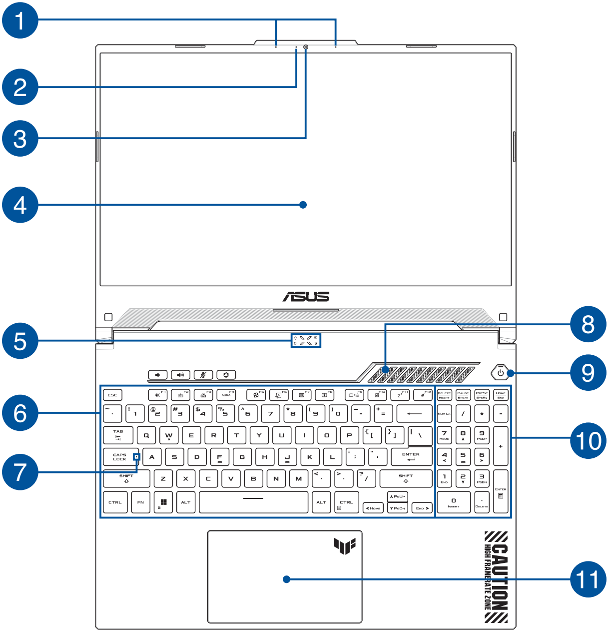
- If you are not using your device for a long period of time, ensure to charge the battery power to 50% then power off your device and disconnect the AC power adapter. Recharge the battery power to 50% every three months to avoid over-discharging and prevent damage to the battery.
- Avoid charging the battery at high voltage for a prolonged period of time to extend the battery life. If you are constantly using AC power for your device, ensure to discharge the battery power to 50% at least once every two weeks. You can also adjust the settings from Battery Health Charging in MyASUS to help extend the battery life.
- It is recommended to store your battery at temperatures between 5°C (41°F) and 35°C (95°F) with the battery power at 50%. You can also adjust the settings from Battery Health Charging in MyASUS to help extend the battery life.
- Do not leave your battery in damp environments. Exposure to damp environments may increase the battery over-discharging rate. Low temperature environment may damage the chemicals inside the battery while high temperature or overheating may result in a risk of explosion.
- Do not place your device or battery pack near radiators, fireplaces, furnaces, heaters, or any sources of heat with temperature exceeding 60°C (140°F). High temperature surrounding environment may result in an explosion or leakage that may cause fire.

Chapter 1:
Hardware Setup

Getting to know your Notebook PC

Front View

NOTE: The keyboard's layout may vary per region or country. The front view may also vary in appearance depending on the Notebook PC model.



1. **Array microphones**

   The array microphones feature echo canceling, noise suppression, and beam forming functions for better voice recognition and audio recording.

2. **Camera indicator**

   The camera indicator lights up when the built-in camera is in use.

3. **Camera**

   The built-in camera allows you to take pictures or record videos using your Notebook PC.

4. **Display panel**

   This high-definition display panel provides excellent viewing features for photos, videos, and other multimedia files on your Notebook PC.

5 Status indicators

The status indicators help identify the current hardware status of your Notebook PC.

Power indicator

The power indicator lights up when the Notebook PC is turned on and blinks slowly when the Notebook PC is in sleep mode.

Two-color battery charge indicator

The two-color LED provides a visual indication of the battery's charge status. Refer to the following table for details:

Color	Status
Solid White	The Notebook PC is plugged to a power source and the battery power is 100%.
Solid Orange	The Notebook PC is plugged to a power source, charging its battery, and the battery power is between 0% and 99%.
Blinking Orange	The Notebook PC is running on battery mode and the battery power is less than 10%.
Lights off	The Notebook PC is running on battery mode and the battery power is between 10% to 100%.

Drive activity indicator

This indicator lights up when your Notebook PC is accessing the internal storage drives.

Airplane mode indicator

This indicator lights up when the Airplane mode in your Notebook PC is enabled.

NOTE: When enabled, the **Airplane mode** disables all wireless connectivity.

6 Keyboard

The keyboard provides full-sized QWERTY keys with a comfortable travel depth for typing. It also enables you to use the function keys, allows quick access to Windows, and controls other multimedia functions.

NOTE: The keyboard layout differs by model or territory.

7 Capital lock indicator

This indicator lights up when the capital lock function is activated. Using capital lock allows you to type capitalized letters (such as A, B, C) using your Notebook PC's keyboard.

8 Air vents

The air vents allow cool air to enter the Notebook PC.

WARNING! Ensure that paper, books, clothing, cables, or other objects do not block any of the air vents or else overheating may occur.

9 Power button

Press the power button to turn your Notebook PC on or off. You can also use the power button to put your Notebook PC to sleep or hibernate mode and wake it up from sleep or hibernate mode.

In the event that your Notebook PC becomes unresponsive, press and hold the power button for at least four (4) seconds until your Notebook PC shuts down.

10 Numeric keypad

The numeric keypad toggles between these two functions: for numeric input and as pointer direction keys.

NOTE: For more details, refer to the *Using the numeric keypad* section in this manual.

---

11 Touchpad

The touchpad allows the use of multi-gestures to navigate onscreen, providing an intuitive user experience. It also simulates the functions of a regular mouse.

NOTE: For more details, refer to the *Using the touchpad* section in this manual.

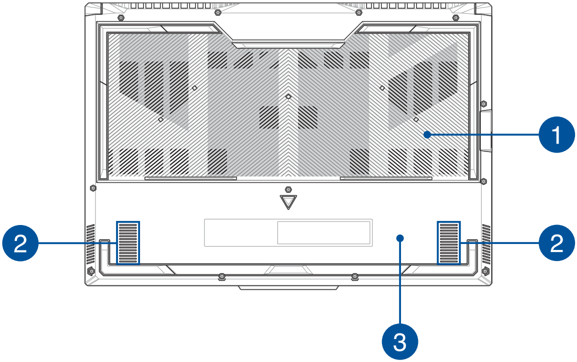
Bottom View

NOTE: The bottom view may vary in appearance depending on model.

WARNING! Your Notebook PC can get warm to hot while in use or while charging the battery pack. Do not leave your Notebook PC on your lap or near any part of your body to prevent injury from heat. When working on your Notebook PC, do not place it on surfaces that can block the vents.

IMPORTANT!

- Battery time varies by usage and by the specifications for this Notebook PC. The battery pack cannot be disassembled.
- Purchase components from authorized retailers to ensure maximum compatibility and reliability. Consult an ASUS service center or authorized retailers for product service or assistance on proper disassembly or assembly of the product.



1 Air vents

The air vents allow cool air to enter or warm air to exit the Notebook PC.

WARNING! Ensure that paper, books, clothing, cables, or other objects do not block any of the air vents or else overheating may occur.

2 Audio speakers

The built-in audio speakers allow you to hear audio straight from your Notebook PC. Audio features are software-controlled.

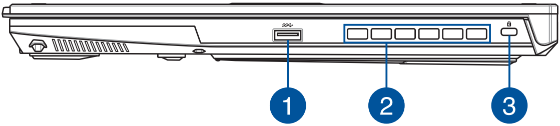
3 Bottom cover

This cover protects the reserved spaces in your Notebook PC for the removable SSD (M.2 2280 slot) and RAM (Random Access Memory) modules.

NOTE:

- For more details, refer to the Service Manual on our multi-language website at https://www.asus.com/support/.
- The M.2 2280 slot does not support M.2 SATA SSD.

Right View



1 **USB 3.2 Gen 1 port**

The USB 3.2 (Universal Serial Bus 3.2) Gen 1 port provides a transfer rate of up to 5 Gbit/s and is backward compatible to USB 2.0.

2 **Air vents**

The air vents allow warm air to exit the Notebook PC.

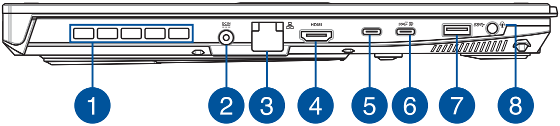
WARNING! Ensure that paper, books, clothing, cables, or other objects do not block any of the air vents or else overheating may occur.

---

3 **Kensington® security slot**

The Kensington® security slot allows you to secure your Notebook PC using Kensington® compatible Notebook PC security products.

Left View



Air vents (on selected models)

1

The air vents allow warm air to exit the Notebook PC.

WARNING! Ensure that paper, books, clothing, cables, or other objects do not block any of the air vents or else overheating may occur.

Power (DC) input port

2

Insert the bundled power adapter into this port to charge the battery pack and supply power to your Notebook PC.

WARNING! The adapter may become warm to hot while in use. Do not cover the adapter and keep it away from your body while it is connected to a power source.

IMPORTANT! Use only the bundled power adapter to charge the battery pack and supply power to your Notebook PC.

3

LAN port

Insert the network cable into this port to connect to a local area network.

WARNING! This LAN port does not support PoE (Power over Ethernet). Connecting a PoE device to your Notebook PC may result in damage to the system board.

4

HDMI output port

This port allows you to send audio and video signals from your Notebook PC to an HDMI-compatible device using an HDMI cable.

5

USB 3.2 Gen 2 Type-C® port

The USB 3.2 (Universal Serial Bus 3.2) Gen 2 Type-C® port provides a transfer rate of up to 10 Gbit/s and is backward compatible to USB 2.0.

NOTE: Transfer rate of this port may vary per model.

6 USB 3.2 Gen 2 Type-C®/DisplayPort/ Power Delivery combo port

The USB 3.2 (Universal Serial Bus 3.2) Gen 2 Type-C® port provides a transfer rate of up to 10 Gbit/s and is backward compatible to USB 2.0. Use a USB Type-C® adapter to connect your Notebook PC to an external display. Connect a power source rated 20V/5A to charge the battery pack and supply power to your Notebook PC.

NOTE: Transfer rate of this port may vary per model.

WARNING! The adapter may become warm to hot while in use. Do not cover the adapter and keep it away from your body while it is connected to a power source.

IMPORTANT!

- It may take longer to fully charge your Notebook PC through a low-voltage power source.
- To prevent any damage, use only power sources rated 20V/5A to charge your Notebook PC with the USB Power Delivery combo port. For more information, consult an ASUS service center for assistance.

7

USB 3.2 Gen 1 port

The USB 3.2 (Universal Serial Bus 3.2) Gen 1 port provides a transfer rate of up to 5 Gbit/s and is backward compatible to USB 2.0.

8

Headphone/Headset/Microphone jack

This port allows you to connect amplified speakers or headphones. You can also use this port to connect your headset or an external microphone.

Chapter 2:
Using your Notebook PC

Getting started

Charge your Notebook PC

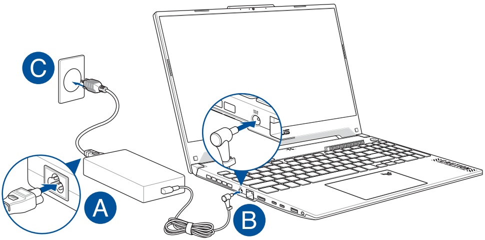
A. Connect the AC power cord to the AC/DC adapter.

B. Connect the DC power connector into your Notebook PC's power (DC) input port.

C. Plug the AC power adapter into a 100V~240V power source.

Charge the Notebook PC for **3 hours** before using it in battery mode for the first time.

NOTE: The power adapter may vary in appearance, depending on models and your region.



IMPORTANT!

AC/DC power adapter information:

- Input voltage: 100-240Vac
- Input frequency: 50-60Hz
- Rating output current: 12A (240W) / 14A (280W)
- Rating output voltage: 20V (240W) / 20V (280W)

USB Power Delivery power adapter* information:

- Input voltage: 100-240Vac
- Input frequency: 50-60Hz
- Rating output current: 5A (100W)
- Rating output voltage: 20V

* *On selected models*

IMPORTANT!

- Locate the input/output rating label on your Notebook PC and ensure that it matches the input/output rating information on your power adapter. Some Notebook PC models may have multiple rating output currents based on the available SKU.
- Ensure that your Notebook PC is connected to the power adapter before turning it on for the first time. Always plug the power cord into a wall socket without using any extension cords. For your safety, connect this device to a properly grounded electrical outlet only.
- The socket outlet must be easily accessible and near your Notebook PC.
- To disconnect your Notebook PC from its main power supply, unplug your Notebook PC from the power socket.

WARNING!

Read the following precautions for your Notebook PC's battery:

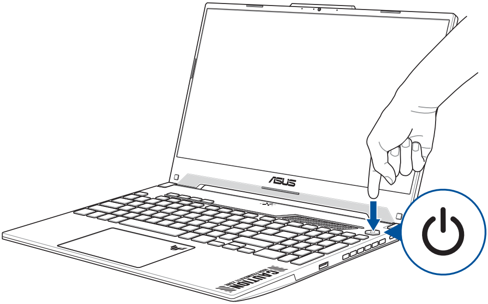
- Only ASUS-authorized technicians should remove the battery inside the device (for non-removable battery only).
- The battery used in this device may present a risk of fire or chemical burn if removed or disassembled.
- Follow the warning labels for your personal safety.
- Risk of explosion if battery is replaced by an incorrect type.
- Do not dispose of in fire.
- Never attempt to short-circuit your Notebook PC's battery.
- Never attempt to disassemble and reassemble the battery (for non-removable battery only).
- Discontinue usage if leakage is found.
- The battery and its components must be recycled or disposed of properly.
- Keep the battery and other small components away from children.

Lift to open the display panel



NOTE: For better heat dissipation, we recommend that you open the display panel to at least 60 degrees while in use.

Press the power button

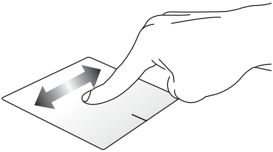


Using the touchpad

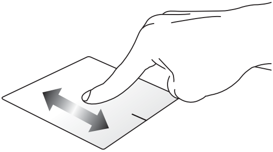
Moving the pointer

You can tap anywhere on the touchpad to activate its pointer, then slide your finger on the touchpad to move the pointer onscreen.

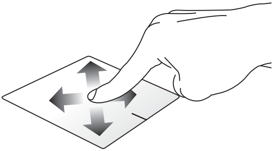
Slide horizontally



Slide vertically

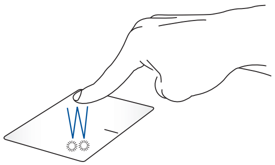


Slide diagonally



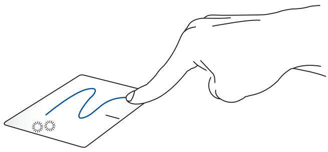
One-finger gestures

Tap/Double-tap



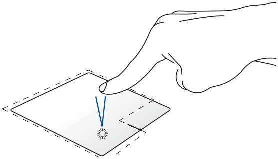
- Tap an app to select it.
- Double-tap an app to launch it.

Drag and drop



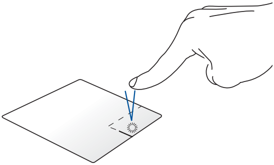
Double-tap an item, then slide the same finger without lifting it off the touchpad. To drop the item to its new location, lift your finger from the touchpad.

Left-click



- Click an app to select it.
- Double-click an app to launch it.

Right-click

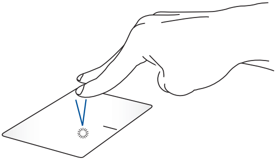


Click this button to open the right-click menu.

NOTE: The areas inside the dotted line represent the locations of the left mouse button and the right mouse button on the touchpad.

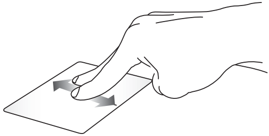
Two-finger gestures

Tap



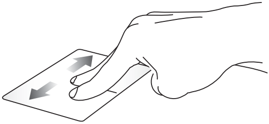
Tap two fingers on the touchpad to simulate the right-click function.

Two-finger scroll (up/down)



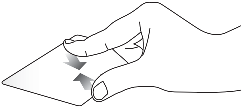
Slide two fingers to scroll up or down.

Two-finger scroll (left/right)



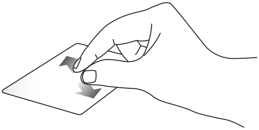
Slide two fingers to scroll left or right.

Zoom out



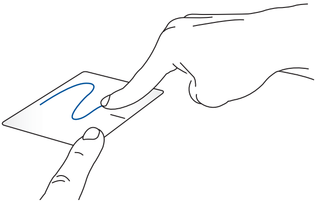
Bring together your two fingers on the touchpad.

Zoom in



Spread apart your two fingers on the touchpad.

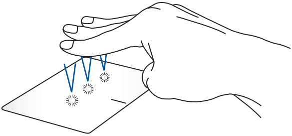
Drag and drop



Select an item then press and hold the left button. Using your other finger, slide on the touchpad to drag the item, lift your finger off the button to drop the item.

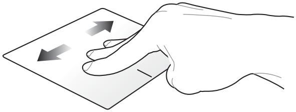
Three-finger gestures

Tap



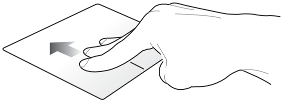
Tap three fingers on the touchpad to launch the function you selected in Settings.

Swipe left/Swipe right



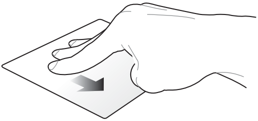
If you opened multiple apps, swipe three fingers left or right to switch between these apps.

Swipe up



Swipe up to see an overview of all the apps currently opened.

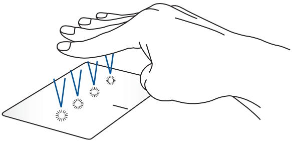
Swipe down



Swipe down to show the desktop.

Four-finger gestures

Tap



Tap four fingers on the touchpad to launch the function you selected in Settings.

Using the keyboard

Function keys

The function keys on your Notebook PC's keyboard can trigger the following commands:

FN + F1	Turns the speaker on or off
FN + F2	Decreases brightness for the backlit keyboard
FN + F3	Increases brightness for the backlit keyboard
FN + F4 (AURA)	Toggles the Aura lighting effect
FN + F5	Toggles the fan mode
FN + F6	Activates screen capture tool
FN + F7	Decreases display brightness
FN + F8	Increases display brightness
FN + F9	Toggles the display mode

NOTE: Ensure that the second display is connected to your Notebook PC.

FN + F10	Enables or disables the touchpad
FN + F11	Puts the Notebook PC into **Sleep mode**
FN + F12	Turns **Airplane mode** on or off

NOTE: When enabled, the **Airplane mode** disables all wireless connectivity.

FN + CTRL	Displays the drop-down menu
FN + PgUp	Simulates the page up key
FN + PgDn	Simulates the page down key
FN + Home	Simulates the home key
FN + End	Simulates the end key
FN + Windows key	Enables or disables the Windows key lock

	Turns the speaker volume down
	Turns the speaker volume up
	Turns the microphone on or off
	Opens the Armoury Crate application

Windows keys

There are two special Windows keys on your Notebook PC's keyboard used as below:

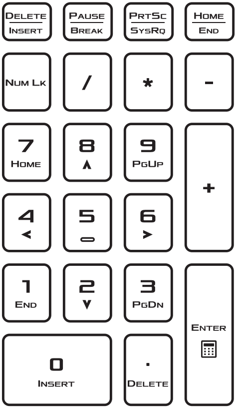
	Launches the Start menu
 or FN + CTRL	Displays the drop-down menu

Using the numeric keypad

NOTE: The numeric keypad layout may differ by model or territory but the usage procedures remain the same.

A numeric keypad is available on selected Notebook PC models. You can use this keypad for numeric input or as pointer direction keys.

Press Num Lk to toggle between using the keypad as number keys or as pointer direction keys.



Chapter 3: Working with Windows

Starting for the first time

When you start your Notebook PC for the first time, a series of screens appear to guide you in configuring your Windows operating system.

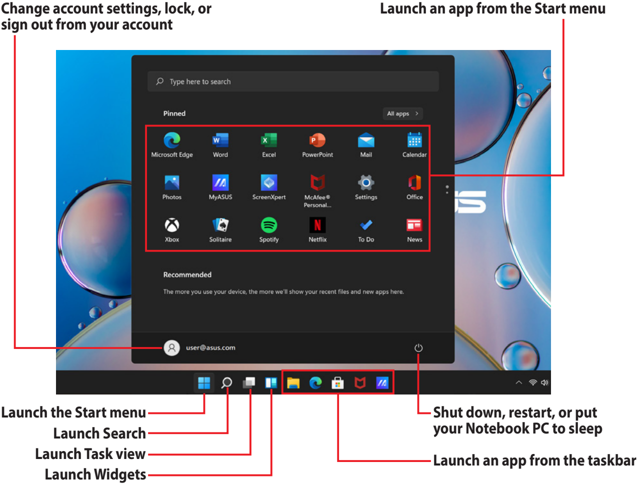
To start your Notebook PC for the first time:

1. Press the power button on your Notebook PC. Wait for a few minutes until the setup screen appears.
2. From the setup screen, pick your region and a language to use on your Notebook PC.
3. Carefully read the License Agreement. Select **Accept**.
4. Follow the onscreen instructions to configure the following basic items:
    - Personalize
    - Get online
    - Settings
    - Your account
5. After configuring the basic items, Windows proceeds to install your apps and preferred settings. Ensure that your Notebook PC is kept powered on during the setup process.
6. Once the setup process is complete, the Desktop appears.

NOTE: The screenshots in this chapter are for reference only.

Start menu

The Start menu is the main gateway to your Notebook PC's programs, Windows apps, folders, and settings.



You can use the Start menu to do these common activities:

- Start programs or Windows apps
- Open commonly used programs or Windows apps
- Adjust Notebook PC settings
- Get help with the Windows operating system
- Turn off your Notebook PC
- Log off from Windows or switch to a different user account

Launching the Start menu

Position your mouse pointer over the Start icon on your desktop then click it.

Press the Windows logo key on your keyboard.

Opening programs from the Start menu

One of the most common uses of the Start menu is opening programs installed on your Notebook PC.

Position your mouse pointer over the program then click to launch it.

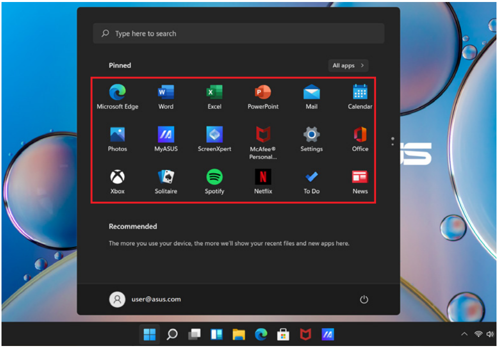
Use the arrow keys to browse through the programs. Press enter to launch it.

NOTE: Select **All apps** to display a full list of programs and folders on your Notebook PC in alphabetical order.

Windows apps

These are apps pinned on the Start menu and displayed in tiled-format for easy access.

NOTE: Some Windows apps require signing in to your Microsoft account before they are fully launched.



Working with Windows apps

Launching Windows apps from the Start menu

Position your mouse pointer over the app then click to launch it.

Use the arrow keys to browse through the apps. Press enter to launch an app.

Customizing Windows apps

You can move, unpin, or pin apps to the taskbar from the Start menu using the following steps:

Moving apps

Position your mouse pointer over the app, then drag and drop the app to a new location.

Unpinning apps

Position your mouse pointer over the app and right-click it, then click **Unpin from Start**.

Use the arrow keys to navigate to the app.

Press ▤ or FN + CTRL (on selected models), then select **Unpin from Start**.

Pinning apps to the taskbar

Position your mouse pointer over the app and right-click it, then click **Pin to taskbar**.

Use the arrow keys to navigate to the app.

Press [≣] or [FN] + [CTRL ≣] (on selected models), then select **Pin to taskbar**.

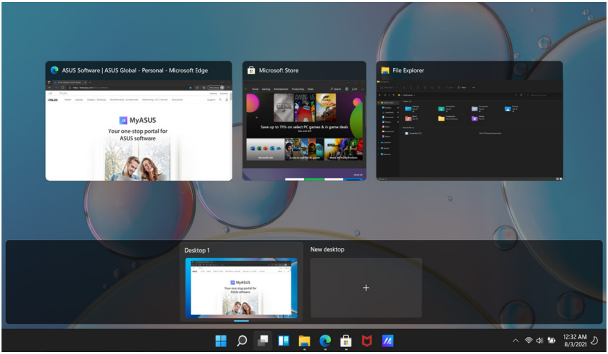
Pinning more apps to the Start menu

From **All apps**, position your mouse pointer over the app you want to add to the Start menu and right-click it, then click **Pin to Start**.

From **All apps**, press [≣] or [FN] + [CTRL ≣] (on selected models) on the app that you want to add to the Start menu, then select **Pin to Start**.

Task view

Quickly switch between opened apps and programs using the Task view feature, you can also use Task view to switch between desktops.



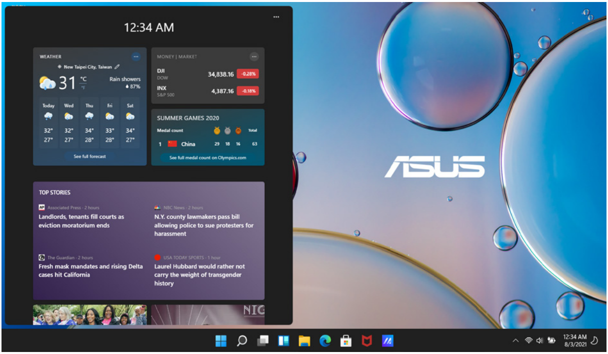
Launching Task view

Position your mouse pointer over the [Task view icon] icon on the taskbar and click it.

Press [Windows key] + [tab] on your keyboard.

Widgets

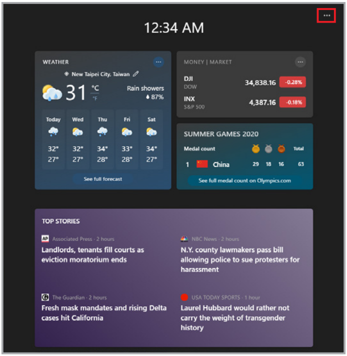
You can launch Widgets for quick access of important info.



Launching Widgets

Position your mouse pointer over the icon on the taskbar and click it.

Press ⊞ + W on your keyboard.

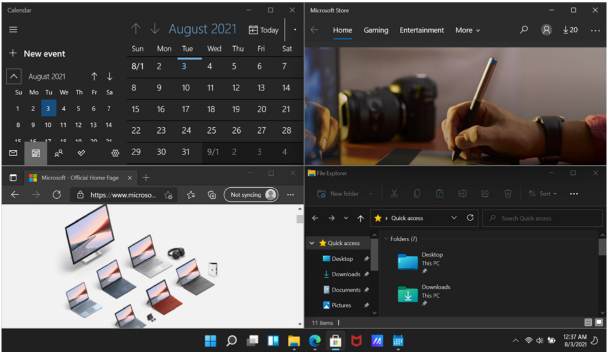


Customizing Widgets

Click/Tap the ••• icon, then select **Manage interests** to change the content that shows up in the Widgets.

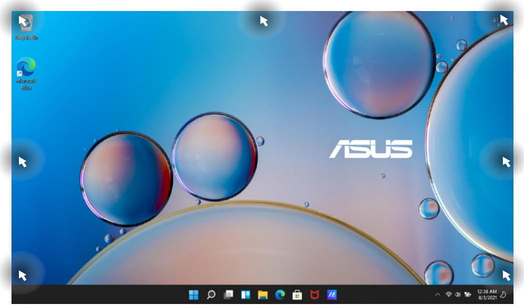
Snap feature

The Snap feature displays apps side-by-side, allowing you to work or switch between apps.



Snap hotspots

You can drag and drop apps to these hotspots to snap them into place.



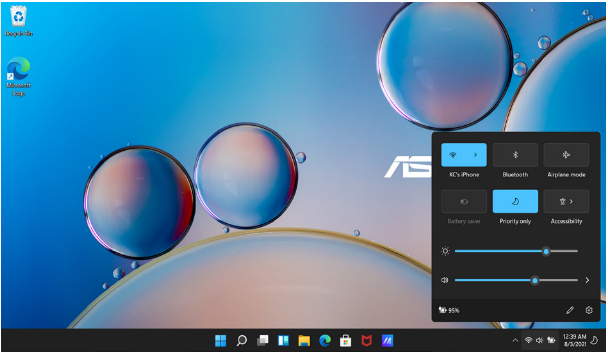
Using Snap

1. Launch the app you wish to snap.
2. Drag the title bar of your app and drop the app to the edge of the screen to snap.
3. Launch another app and repeat the above steps to snap another app.

1. Launch the app you wish to snap.
2. Press and hold the key, then use the arrow keys to snap the app.
3. Launch another app and repeat the above steps to snap another app.

Action Center

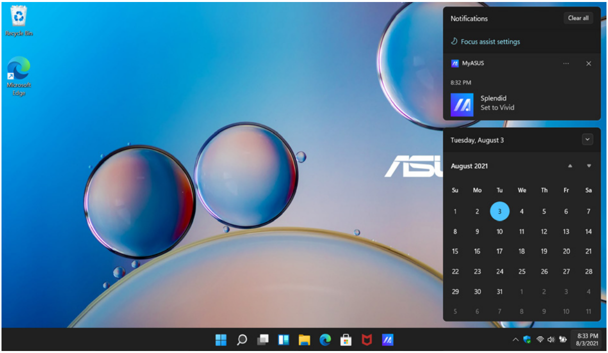
Action Center consolidates notifications from apps and presents a single place where you can interact with them. It also has a really useful Quick Actions section.



Launching Quick Actions

Position your mouse pointer over the status icons on the taskbar and click it.

Press ⊞ + A on your keyboard.



Launching Notifications

Position your mouse pointer over the date and time on the taskbar and click it.

Press ⊞ + N on your keyboard.

Setting the OLED display

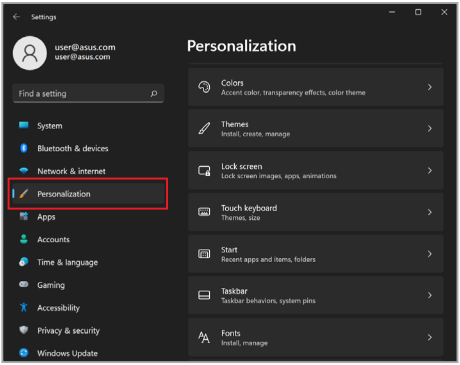
To ensure the most out of your OLED display (on selected models), there are several settings that we recommend. These settings help to optimize the visual experience, maximize battery life, and extend the lifespan of your ASUS Notebook PC.

Setting the Dark Mode

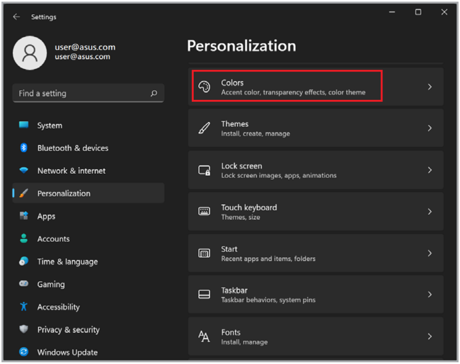
The Dark Mode is enabled by default. To check or adjust the settings:

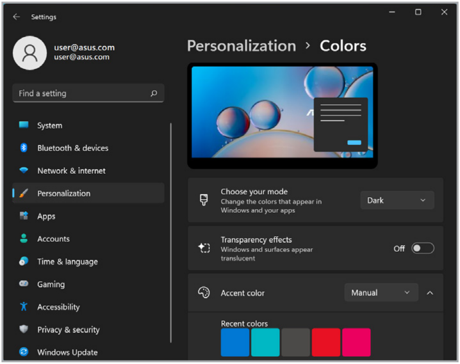
1. Launch the Start menu.

2. Click/Tap **Settings** and select **Personalization**.



3. Select the **Colors** tab to view the options.

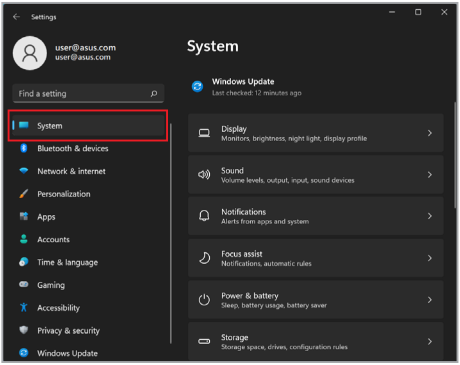




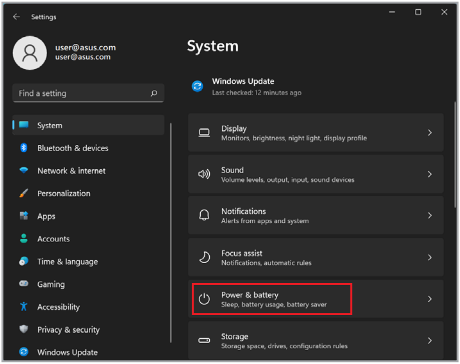
Turning off the display when not in use

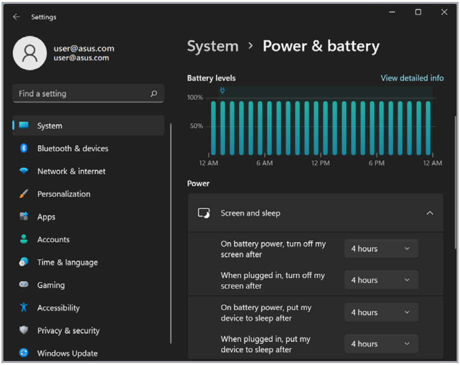
Ensure to set your display to turn off automatically when not in use. To check or adjust the settings:

1. Launch the Start menu.
2. Click/Tap **Settings** and select **System**.



3. Select the **Power & battery** tab to view the options.



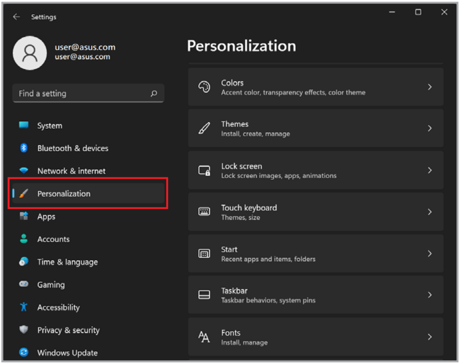


Adjusting display brightness

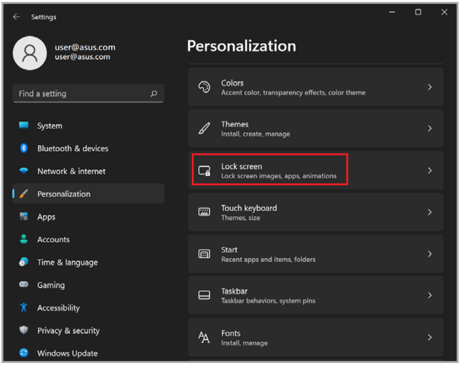
It is recommended to enable animated dark-background screensaver and avoid setting your OLED display at maximum brightness to extend the lifespan of your OLED display. To check or adjust the settings:

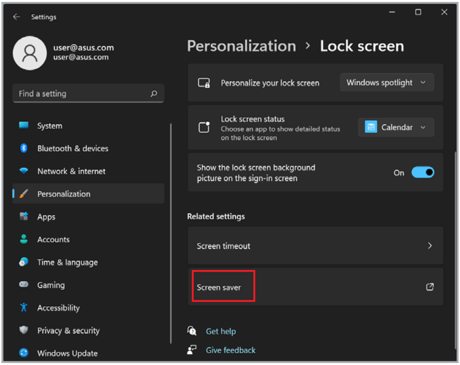
1. Launch the Start menu.

2. Click/Tap **Settings** and select **Personalization**.



3. Select the **Lock screen** tab and then select **Screen saver** to view the options.



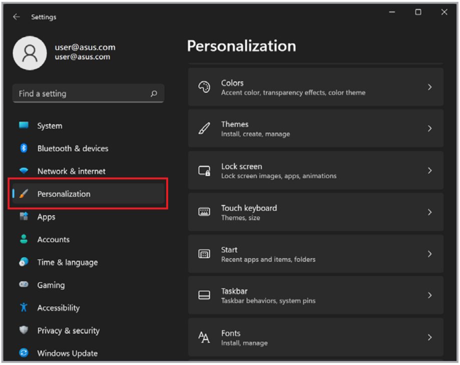


Auto-hide the taskbar

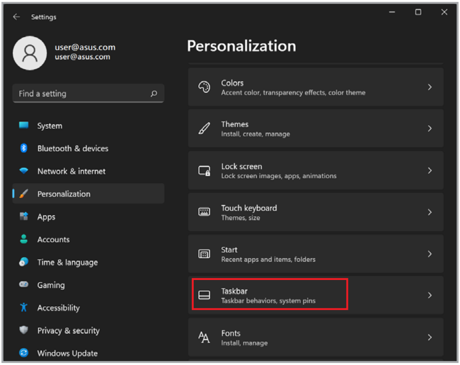
To avoid displaying the taskbar on your OLED display for prolonged time, ensure to auto-hide the taskbar. To adjust the settings:

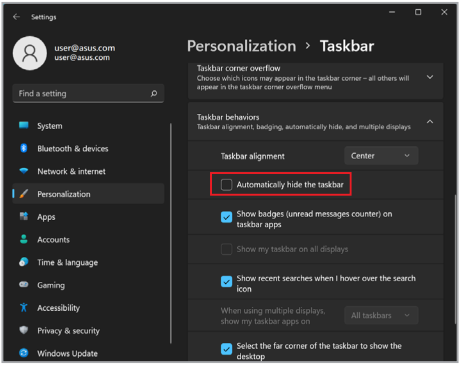
1. Launch the Start menu.

2. Click/Tap **Settings** and select **Personalization**.



3. Select the **Taskbar** tab and then enable **Automatically hide the taskbar**.





Setting the Dark Mode in Microsoft Office

1. Launch a Microsoft Office application, and then click/tap **File** > **Account**.
2. Select **Dark Gray** under **Office Theme**. The theme will be applied to all the Microsoft applications.

Other keyboard shortcuts

Using the keyboard, you can also use the following shortcuts to help you launch applications and navigate Windows.

⊞	Launches **Start menu**
⊞ + A	Launches **Action Center**
⊞ + D	Launches the desktop
⊞ + E	Launches the **File Explorer**
⊞ + I	Launches **Settings**
⊞ + K	Launches **Connect** panel
⊞ + L	Activates the Lock screen
⊞ + M	Minimizes all currently active windows

Windows key + S	Launches **Search**
Windows key + P	Launches **Project** panel
Windows key + R	Opens the **Run** window
Windows key + U	Opens **Accessibility**
Windows key + X	Opens the context menu of the Start button
Windows key + (+ =)	Launches the magnifier icon and zooms in your screen
Windows key + (_ -)	Zooms out your screen

Connecting to wireless networks

Wi-Fi

Access emails, surf the Internet, and share applications via social networking sites using your Notebook PC's Wi-Fi connection.

IMPORTANT! Airplane mode disables this feature. Ensure that **Airplane mode** is turned off before enabling the Wi-Fi connection of your Notebook PC.

Connecting Wi-Fi

Connect your Notebook PC to a Wi-Fi network by using the following steps:

1. Launch **Action Center** from the taskbar.
2. Click/Tap the **Wi-Fi** icon to enable Wi-Fi.
3. Select an access point from the list of available Wi-Fi connections.
4. Select **Connect** to start the network connection.

NOTE: You may be prompted to enter a security key to activate the Wi-Fi connection.

Bluetooth

Use Bluetooth to facilitate wireless data transfers with other Bluetooth-enabled devices.

IMPORTANT! Airplane mode disables this feature. Ensure that **Airplane mode** is turned off before enabling the Bluetooth connection of your Notebook PC.

Pairing with other Bluetooth-enabled devices

You need to pair your Notebook PC with other Bluetooth-enabled devices to enable data transfers. Connect your devices by using the following steps:

1. Launch **Settings** from the Start menu.
2. Select **Bluetooth & devices** > **Add device** to search for Bluetooth-enabled devices.
3. Select a device from the list to pair your Notebook PC with the device.

NOTE: For some Bluetooth-enabled devices, you may be prompted to key in the passcode of your Notebook PC.

Airplane mode

Airplane mode disables wireless communication, allowing you to use your Notebook PC safely while in-flight.

NOTE: Contact your airline provider to learn about related in-flight services that can be used and restrictions that must be followed when using your Notebook PC in-flight.

Turning Airplane mode on/off

1. Launch **Action Center** from the taskbar.
2. Click/Tap the **Airplane mode** icon to enable or disable Airplane mode.

Connecting to wired networks

You can also connect to wired networks, such as local area networks and broadband Internet connection, using your Notebook PC's LAN port.

NOTE: Contact your Internet Service Provider (ISP) for details or your network administrator for assistance in setting up your Internet connection.

To configure your settings, refer to the following procedures.

IMPORTANT! Ensure that a network cable is connected between your Notebook PC's LAN port and a local area network before performing the following actions.

Configuring a dynamic IP/PPPoE network connection

1. Launch **Settings**.
2. Select **Network & internet**.
3. Select **Dial-up > Network and Sharing Center**.
4. Select your LAN then select **Properties**.
5. Select **Internet Protocol Version 4 (TCP/IPv4)** then select **Properties**.
6. Select **Obtain an IP address automatically** then select **OK**.

NOTE: Proceed to the next steps if you are using PPPoE connection.

---

7. Return to the **Network and Sharing Center** window then select **Set up a new connection or network**.

8. Select **Connect to the Internet** then select **Next**.

9. Select **Broadband (PPPoE)**.

10. Type your User name, Password, and Connection name then select **Connect**.

11. Select **Close** to finish the configuration.

12. Click/Tap the status icons on the taskbar then select the connection you just created.

13. Type your user name and password then select **Connect** to start connecting to the Internet.

Configuring a static IP network connection

1. Repeat steps 1 to 5 under *Configuring a dynamic IP/PPPoE network connection*.

2. Select **Use the following IP address**.

3. Type the IP address, Subnet mask and Default gateway from your service provider.

4. If needed, you can also type the preferred DNS server address and alternate DNS server address then select **OK**.

Turning your Notebook PC off

You can turn off your Notebook PC by doing either of the following procedures:

- Launch the Start menu, then select ⏻ > **Shut down** to do a normal shutdown.
- From the log-in screen, select ⏻ > **Shut down**.

- Press ALT + F4 (AURA) to launch Shut Down Windows. Select **Shut down** from the drop-down list then select **OK**.
- If your Notebook PC is unresponsive, press and hold the power button for at least four (4) seconds until your Notebook PC turns off.

Putting your Notebook PC to sleep

To put your Notebook PC to Sleep mode:

- Launch the Start menu, then select ⏻ > **Sleep** to put your Notebook PC to sleep.
- From the log-in screen, select ⏻ > **Sleep**.

Press ALT + F4 to launch Shut Down Windows.

Select **Sleep** from the drop-down list then select **OK**.

NOTE: You can also put your Notebook PC to Sleep mode by pressing the power button once.

Chapter 4:
Power-On Self-Test (POST)

The Power-On Self-Test (POST)

The POST (Power-On Self-Test) is a series of software-controlled diagnostic tests that run when you turn on or restart your Notebook PC. The software that controls the POST is installed as a permanent part of the Notebook PC's architecture.

Using POST to access BIOS and Troubleshoot

During POST, you can access the BIOS settings or run troubleshooting options using the function keys of your Notebook PC. You may refer to the following information for more details.

BIOS

The BIOS (Basic Input and Output System) stores system hardware settings that are needed for system startup in the Notebook PC.

The default BIOS settings apply to most conditions of your Notebook PC. Do not change the default BIOS settings except in the following circumstances:

- An error message appears onscreen during system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or updates.

WARNING! Using inappropriate BIOS settings may result to system instability or boot failure. We strongly recommend that you change the BIOS settings only with the help of a trained service personnel.

Accessing BIOS

Restart your Notebook PC then press  during POST.

Recovering your system

Using recovery options on your Notebook PC allows you to restore the system to its original state or simply refresh its settings to help improve performance.

IMPORTANT!

- Backup all your data files before doing any recovery option on your Notebook PC.
- Note down important customized settings such as network settings, user names, and passwords to avoid data loss.
- Ensure that your Notebook PC is plugged in to a power source before resetting your system.

Windows allows you to do any of the following recovery options:

- **Keep my files** - This option allows you to refresh your Notebook PC without affecting personal files (photos, music, videos, documents).

  Using this option, you can restore your Notebook PC to its default settings and delete other installed apps.

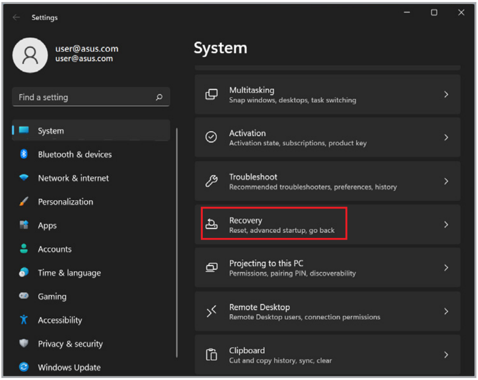
- **Remove everything** - This option resets your Notebook PC to its factory settings. You must backup your data before doing this option.

- **Advanced startup** - Using this option allows you to perform other advanced recovery options on your Notebook PC such as:
  - Using a USB drive, network connection or Windows recovery DVD to startup your Notebook PC.
  - Using **Troubleshoot** to enable any of these advanced recovery options: Startup Repair, Uninstall Updates, Startup Settings, UEFI Firmware Settings, Command Prompt, System Restore, and System Image Recovery.

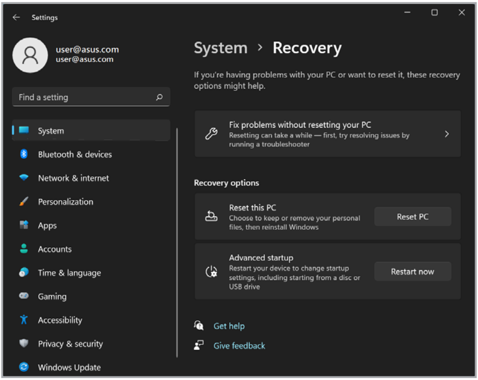
Performing a recovery option

Refer to the following steps if you want to access and use any of the available recovery options for your Notebook PC.

1. Launch **Settings** and select **System** > **Recovery**.



2. Select the recovery option you would like to perform.



Tips and FAQs

Useful tips for your Notebook PC

To help you maximize the use of your Notebook PC, maintain its system performance, and ensure all your data are kept secured, here are some useful tips that you can follow:

- Update Windows periodically to ensure that your applications have the latest security settings.
- Update MyASUS to ensure that you have the latest settings for ASUS exclusive applications, drivers, and utilities.
- Use an anti-virus software to protect your data and keep this updated too.
- Unless absolutely necessary, refrain from using force shutdown to turn off your Notebook PC.
- Always backup your data and make it a point to create a backup data in an external storage drive.
- If you are not using your Notebook PC for a long period of time, ensure to charge the battery power to 50% then power off your Notebook PC and disconnect the AC power adapter.
- If you are constantly using AC power for your Notebook PC, set the Battery Health Charging to Balanced mode in MyASUS.

- Disconnect all external devices and ensure you have the following items prior to resetting your Notebook PC:
  - Product key for your operating systems and other installed applications
  - Backup data
  - Log in ID and password
  - Internet connection information
- Visit our support site for troubleshooting and view some of the most frequently asked questions at https://www.asus.com/support.

Hardware FAQs

1. **A black dot, or sometimes a colored dot, appears onscreen when I turn on the Notebook PC. What should I do?**

   Although these dots normally appear onscreen, they will not affect your system. If the incident continues and subsequently affects system performance, consult an authorized ASUS service center.

2. **My display panel has an uneven color and brightness. How can I fix this?**

   The color and brightness of your display panel may be affected by the angle and current position of your Notebook PC. The brightness and color tone of your Notebook PC may also vary per model. You may use the function keys or the display settings in your operating system to adjust the appearance of your display panel.

3. **How can I maximize my Notebook PC 's battery life?**

   You can try doing any of the following suggestions:

   - Use the function keys to adjust the display brightness.
   - If you are not using any Wi-Fi connection, switch your system into **Airplane mode**.
   - Disconnect unused USB devices.
   - Close unused applications, especially those that take up too much system memory.

4. My battery charge indicator does not light up. What's wrong?

- Check whether the power adapter or battery pack is attached correctly. You may also disconnect the power adapter or battery pack, wait for a minute, then reconnect them again to the power outlet and Notebook PC.

- If the problem still exists, contact your local ASUS service center for assistance.

5. Why is my touchpad not working?

Press 

+ 

to enable your touchpad.

6. When I play audio and video files, why can't I hear any sound from my Notebook PC's audio speakers?

You can try doing any of the following suggestions:

- Press  to turn up the speaker volume.

- Check if your speakers were set to mute.

- Check if a headphone jack is connected to your Notebook PC and remove it.

7. What should I do if my Notebook PC's power adapter gets lost or my battery stops working?

Contact your local ASUS service center for assistance.

8. My Notebook PC cannot do keystrokes correctly because my cursor keeps on moving. What should I do?

Make sure that nothing accidentally touches or presses on your touchpad while you type on the keyboard. You can also disable your touchpad by pressing FN + F10 .

9. I have disabled sleep mode, but why does my Notebook PC still go into sleep mode when I close the lid?

Closing the lid when the system is under high load forces your Notebook PC to go into sleep mode to prevent overheating.

Software FAQs

1. **When I turn on my Notebook PC, the power indicator lights up but nothing appears on my screen. What can I do to fix this?**

   You can try doing any of the following suggestions:

   - Force shutdown your Notebook PC by pressing the power button for at least four (4) seconds. Check if the power adapter and battery pack are inserted correctly then turn on your Notebook PC.
   - If the problem still exists, contact your local ASUS service center for assistance.

2. **What should I do when my screen displays this message: "Remove disks or other media. Press any key to restart."?**

   You can try doing any of the following suggestions:

   - Remove all connected USB devices then restart your Notebook PC.
   - Remove any optical discs that are left inside the optical drive then restart.
   - If the problem still exists, your Notebook PC might have a memory storage problem. Contact your local ASUS service center for assistance.

3. **My Notebook PC boots slower than usual and my operating system lags. How can I fix this?**

   Delete the applications you recently installed or were not included with your operating system package then restart your system.

4. My Notebook PC does not boot up. How can I fix this?

You can try doing any of the following suggestions:

- Remove all connected devices to your Notebook PC then restart your system.
- If the problem still exists, contact your local ASUS service center for assistance.

5. Why can't my Notebook PC wake up from sleep mode?

- You need to press the power button to resume your last working state.
- Your system might have completely used up its battery power. Connect the power adapter to your Notebook PC and connect to a power outlet then press the power button.

Appendices

Federal Communications Commission Interference Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING! The use of a shielded-type power cord is required in order to meet FCC emission limits and to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used. Use only shielded cables to connect I/O devices to this equipment. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

(Reprinted from the Code of Federal Regulations #47, part 15.193, 1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office.)

FCC RF Exposure Information

This device meets the government's requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government. The exposure standard employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/kg. Tests for SAR are conducted using standard operating positions accepted by the FCC with the EUT transmitting at the specified power level in different channels. The FCC has granted an Equipment Authorization for this device with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this device is on file with the FCC and can be found under the Display Grant section of www.fcc.gov/oet/ea/fccid.

FCC RF Caution Statement

WARNING! Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Innovation, Science and Economic Development Canada (ISED) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has been evaluated for and shown compliant with the ISED Specific Absorption Rate ("SAR") limits when operated in portable exposure conditions.

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie rayonnée du dispositif sans fil est inférieure aux limites d'exposition aux radiofréquences d'Innovation, Sciences et Développement économique Canada (ISED). Le dispositif sans fil doit être utilisé de manière à minimiser le potentiel de contact humain pendant le fonctionnement normal.

Cet appareil a été évalué et montré conforme aux limites de DAS (Débit d'Absorption Spécifique) de l'ISED lorsqu'il est utilisé dans des conditions d'exposition portables.

ENERGY STAR® Qualified Product

ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.

All ASUS products with the ENERGY STAR® logo comply with the ENERGY STAR® standard, and the power management feature is enabled by default. The monitor is automatically set to sleep within 10 minutes of user inactivity; the computer is automatically set to sleep within 30 minutes of user inactivity. To wake your computer, click the mouse, press any key on the keyboard, or press the power button.

Please visit https://www.energystar.gov/powermanagement for detailed information on power management and its benefits to the environment. In addition, please visit https://www.energystar.gov for detailed information on the ENERGY STAR® joint program.

NOTE: ENERGY STAR® is NOT supported on FreeDOS and Linux-based products.

Compliance Statement of Innovation, Science and Economic Development Canada (ISED)

This device complies with *Innovation, Science and Economic Development Canada* licence exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

CAN ICES-003(B)/NMB-003(B)

Déclaration de conformité de Innovation, Sciences et Développement économique Canada (ISED)

Le présent appareil est conforme aux CNR d'*Innovation, Sciences et Développement économique Canada* applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

La bande 5150–5250 MHz est réservée uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

CAN ICES-003(B)/NMB-003(B)

UL Safety Notices

Required for UL 1459 covering telecommunications (telephone) equipment intended to be electrically connected to a telecommunication network that has an operating voltage to ground that does not exceed 200V peak, 300V peak-to-peak, and 105V rms, and installed or used in accordance with the National Electrical Code (NFPA 70).

When using the Notebook PC modem, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

- DO NOT use the Notebook PC near water, for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
- DO NOT use the Notebook PC during an electrical storm. There may be a remote risk of electric shock from lightning.
- DO NOT use the Notebook PC in the vicinity of a gas leak.

Required for UL 1642 covering primary (non-rechargeable) and secondary (rechargeable) lithium batteries for use as power sources in products. These batteries contain metallic lithium, or a lithium alloy, or a lithium ion, and may consist of a single electrochemical cell or two or more cells connected in series, parallel, or both, that convert chemical energy into electrical energy by an irreversible or reversible chemical reaction.

- DO NOT dispose the Notebook PC battery pack in a fire, as they may explode. Check with local codes for possible special disposal instructions to reduce the risk of injury to persons due to fire or explosion.
- DO NOT use power adapters or batteries from other devices to reduce the risk of injury to persons due to fire or explosion. Use only UL certified power adapters or batteries supplied by the manufacturer or authorized retailers.

Power Safety Requirement

Products with electrical current ratings up to 6A and weighing more than 3Kg must use approved power cords greater than or equal to: H05VV-F, 3G, 0.75mm^2 or H05VV-F, 2G, 0.75mm^2.

TV Notices

Note to CATV System Installer—Cable distribution system should be grounded (earthed) in accordance with ANSI/NFPA 70, the National Electrical Code (NEC), in particular Section 820.93, Grounding of Outer Conductive Shield of a Coaxial Cable – installation should include bonding the screen of the coaxial cable to the earth at the building entrance.

Macrovision Corporation Product Notice

This product incorporates copyright protection technology that is protected by method claims of certain U.S.A. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only *unless otherwise authorized by Macrovision Corporation*. Reverse engineering or disassembly is prohibited.

Prevention of Hearing Loss

To prevent possible hearing damage, do not listen at high volume levels for long periods.



Nordic Lithium Cautions (for lithium-ion batteries)

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. (English)

ATTENZIONE! Rischio di esplosione della batteria se sostituita in modo errato. Sostituire la batteria con un una di tipo uguale o equivalente consigliata dalla fabbrica. Non disperdere le batterie nell'ambiente. (Italian)

VORSICHT! Explosionsgefahr bei unsachgemäßen Austausch der Batterie. Ersatz nur durch denselben oder einem vom Hersteller empfohlenem ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers. (German)

ADVARSELI! Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren. (Danish)

VARNING! Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion. (Swedish)

VAROITUS! Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan sousittelemaan tyyppiin. Hävitä käytetty paristo valmistagan ohjeiden mukaisesti. (Finnish)

ATTENTION! Danger d'explosion si la batterie n'est pas correctement remplacée. Remplacer uniquement avec une batterie de type semblable ou équivalent, recommandée par le fabricant. Jeter les batteries usagées conformément aux instructions du fabricant. (French)

ADVARSEL! Eksplosjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner. (Norwegian)

標準品以外の使用は、危険の元になります。交換品を使用する場合、製造者に指定されるものを使って下さい。製造者の指示に従って処理して下さい。(Japanese)

ВНИМАНИЕ! При замене аккумулятора на аккумулятор иного типа возможно его возгорание. Утилизируйте аккумулятор в соответствии с инструкциями производителя. (Russian)

Declaration of Compliance for Product Environmental Regulation

ASUS follows the green design concept to design and manufacture our products, and makes sure that each stage of the product life cycle of ASUS product is in line with global environmental regulations. In addition, ASUS disclose the relevant information based on regulation requirements.

Please refer to http://csr.asus.com/Compliance.htm for information disclosure based on regulation requirements ASUS is complied with.

EU REACH and Article 33

Complying with the REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulatory framework, we publish the chemical substances in our products at ASUS REACH website at http://csr.asus.com/english/REACH.htm.

EU RoHS

This product complies with the EU RoHS Directive. For more details, see http://csr.asus.com/english/article.aspx?id=35.

Japan JIS-C-0950 Material Declarations

Information on Japan RoHS (JIS-C-0950) chemical disclosures is available on http://csr.asus.com/english/article.aspx?id=19.

India RoHS

This product complies with the "India E-Waste (Management) Rules, 2016" and prohibits use of lead, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) in concentrations exceeding 0.1% by weight in homogenous materials and 0.01% by weight in homogenous materials for cadmium, except for the exemptions listed in Schedule II of the Rule.

Vietnam RoHS

ASUS products sold in Vietnam, on or after September 23, 2011, meet the requirements of the Vietnam Circular 30/2011/TT-BCT.

Các sản phẩm ASUS bán tại Việt Nam, vào ngày 23 tháng 9 năm2011 trở về sau, đều phải đáp ứng các yêu cầu của Thông tư 30/2011/TT-BCT của Việt Nam.

Regional notice for Singapore

Complies with IMDA Standards DB103778

This ASUS product complies with IMDA Standards.

Coating Notice

IMPORTANT! To provide electrical insulation and maintain electrical safety, a coating is applied to insulate the device except on the areas where the I/O ports are located.

ASUS Recycling/Takeback Services

ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials.

Please go to http://csr.asus.com/english/Takeback.htm for detailed recycling information in different regions.

Rechargeable Battery Recycling Service in North America

For US and Canada customers, you can call 1-800-822-8837 (toll-free) for recycling information of your ASUS products' rechargeable batteries.

Ecodesign Directive

European Union announced a framework for the setting of ecodesign requirements for energy-related products (2009/125/EC). Specific Implementing Measures are aimed at improving environmental performance of specific products or across multiple product types. ASUS provides product information on the CSR website. Further information could be found at https://csr.asus.com/english/article.aspx?id=1555.

EPEAT Registered Products

The public disclosure of key environmental information for ASUS EPEAT (Electronic Product Environmental Assessment Tool) registered products is available at https://csr.asus.com/english/article.aspx?id=41. More information about EPEAT program and purchase guidance can be found at www.epeat.net.

Notices for removable batteries

- Risk of explosion if battery is replaced by an incorrect type.
- The battery and its component must be recycled or disposed of properly.

Avis concernant les batteries remplaçables

- La batterie de l'appareil peut présenter un risque d'incendie ou de brûlure si celle-ci est retirée ou désassemblée.
- La batterie et ses composants doivent être recyclés de façon appropriée.

Simplified EU Declaration of Conformity

ASUSTek Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. Full text of EU declaration of conformity is available at https://www.asus.com/support/.

The WiFi operating in the band 5150-5350 MHz shall be restricted to indoor use for countries listed in the table below:

AT	BE	BG	CZ	DK	EE	FR
DE	IS	IE	IT	EL	ES	CY
LV	LI	LT	LU	HU	MT	NL
NO	PL	PT	RO	SI	SK	TR
FI	SE	CH	HR	UK(NI)		

CE

Simplified UKCA Declaration of Conformity

ASUSTek Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of The Radio Equipment Regulations 2017 (S.I. 2017/1206). Full text of UKCA declaration of conformity is available at https://www.asus.com/support/.

The WiFi operating in the band 5150-5350 MHz shall be restricted to indoor use for the country listed below:

UK

Caution

(i) The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

Mise en garde

(i) Les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement à une utilisation en intérieur afin de réduire les risques d'interférence préjudiciables aux systèmes de satellites mobiles utilisant les mêmes canaux.